

# PET User Notes

*Publication of the PET User Group      P.O. Box 371    Montgomeryville, PA 18936*

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Since this is the first formal issue of the User Notes, a brief introduction is in order to describe our purpose and functions.

First, we are not a part of the Commodore organization. The Commodore people have been helpful in answering questions, but we receive no support from them.

Our general purpose will be to publish information that will hopefully be valuable to Commodore PET users and potential users. The PET User Group exists to share and exchange applications, programs, and hardware expansion techniques, and to provide general user feedback. Most of the information we publish will come from members or people with something to share with the User Group (this first issue will be an exception, since the group is new and the number of PET's in user hands to date is quite small).

The PET User Notes will be published on a bi-monthly basis initially, with the intention of more frequent publication if interest and demand warrant. This first issue is being sent on a complimentary basis to many people. If you are interested in the PET User Group, please send the \$5.00 membership fee -- we can't afford the mailing and printing costs without it.

Software exchange will probably occupy a great amount of space in the User Notes. This could take the form of complete program and program segment listings, or program summary/abstract listings along with how to obtain the source code. I also anticipate that many software houses, as well as individuals, will have programs for sale. I will attempt to list these programs and systems as well, since most PET owners will be interested in software availability regardless of cost (I feel that most commercially available programs will be sold for a very nominal price).

Commodore intends to market software for PET also. They are interested in acquiring (on a purchase or royalty basis) good, tested, and marketable software packages. If you feel you have an acceptable package, or want to develop one, the contact at

Commodore is:

Ms. Terry Laudereau  
Commodore Business Machines  
901 California Avenue  
Palo Alto, CA 94304 (415) 326-4000

The Commodore software will probably be marketed by them directly as well as through PET dealers.

Software that would be of interest initially would be packages that run on a basic 4K or 8K PET with the single cassette drive. These could include graphics applications, games, educational packages (computer assisted instruction), and business and scientific calculations. As disks, printers, and additional tape drives become available, more complete business systems will be in demand, and with the advent of specialized hardware, support software for communications, control, and instrumentation could be needed.

A final note on software -- a number of people have asked if the User Group will assist in software distribution for PET. I would be willing to perform that function, at least initially. In general, the cost would be minimal (the cost of a cassette or listing plus postage).

Several people have indicated a desire to develop expansion hardware for PET. The User Notes will list hardware and, if available, will print specifications and circuit schematics. Some of the projects that have been mentioned: S-100 bus adapter; A/D; D/A; and real time controllers.

A comment in closing this introduction: I am aware that a User Group for an item that could be mass produced and mass marketed might not be desirable. The PET owner who purchases computer and canned software from a department store and is interested only in playing a game or watching a predetermined graphics display might not care about a User Group (I might be wrong about that--perhaps a Maytag Washer and Dryer User Group could be viable). I feel, however, a significant number of PET users will be interested in software development and hardware extension and expansion, and will find the PET User Group a good exchange medium to further their interests.

As the PET gains acceptance in the business community (this will be given a boost with the PET II), the User Group could become even more valuable in spreading application and software information.

#### What is the PET

A number of people have asked about the PET features. At the risk of sounding redundant (since several PET articles have appeared in the computer magazines) most of the PET hardware and software characteristics are included in this first issue to answer those questions.

#### Approximate dimensions 16.5" wide, 14" high, 18.5" deep.

Initial units will be in a nice looking metal case while later units probably will have a molded plastic housing.

Memory Either 4K or 8K bytes user RAM internal. Expansion to maximum of 32K bytes. The circuit board is different for the 4K and 8K internal memories -- you cannot buy a 4K unit and add chips. Expansion beyond the initial 4K or 8K is external. The operating system (6K) and BASIC interpreter (8K) are resident in ROM.

Keyboard 9.5" wide, 3" high, arranged in two separate sections: a main alpha keyboard; and a numeric (calculator style) keypad. (Note: the main keyboard has the rows in the same sequence as a standard typewriter, but the columns are not offset as on a typewriter. This arrangement, combined with the small keyboard size, would make touch typing moderately difficult.) All 64 ASCII characters available without shift. Graphics and reverse field representation require shift key. Has screen clear and erase, character insert/delete key, and cursor movement key.

CRT/Video Display 9" black and white with very good resolution. Characters and graphic symbols displayed in 8x8 dot matrix. Display has 1000 characters in 25 row (line) by 40 column format. Lines fold over to maximum of 80 characters. Automatic scrolling from bottom of screen, winking cursor, and reverse field for all characters. All graphics symbols are discrete -- large scale objects are displayed by appropriate selection of contiguous graphics characters. Lower case alpha can be displayed by POKEing an address (POKE 59468, 14).

Cassette Storage Cassette is modified audio cassette (Commodore format). Net rate is 1100 bits/second after redundancy checking. Uses standard audio cassettes. A second cassette drive will be available from Commodore.

Operating System Cassette file management from BASIC. File management handled by OS. Tape files can have up to 16 character file names. Able to search for one of multiple named files on tape. Record read-write through OS under program control.

Input/Output An 8-bit parallel port with handshaking is provided. Single character I/O with GET command. Other I/O will be supported through IEEE-488 instrument interface.

Miscellaneous Power supply is enough probably for only the hardware in the basic 8K PET. A machine language monitor will probably be available on tape. Uses 1 Megahertz clock. An internal clock can be accessed from BASIC.

BASIC INTERPRETER The 8K Expanded BASIC was written by Micro Soft (the people who did Altair and OSI BASIC) and is extremely good. Floating point variables occupy 5 bytes and have 10 significant digits. Integer variables require 2 bytes. String variables can be up to 255 characters. Variable names are 2 bytes. Maximum length of single dimensioned array is 255. Has multiple-dimensioned array capability. A listing of PET BASIC commands from Commodore is included.

## PET 2001 BASIC

### Variables

TYPES: Real Integer (%) String (\$)

NAMES: Variable names are uniquely given as a letter or a letter followed by a letter or a digit.

### Special Variables

TI TIS Time of day

ST Status word for I/O operations

### Standard Dartmouth BASIC Statements

LET READ PRINT DATA IF  
THEN FOR NEXT DIM END  
GOTO

### Extended BASIC Statements

RESTORE REM GET GOSUB DEF  
RETURN STOP STEP INPUT FN  
ON...GOTO ON...GOSUB

### Scientific Functions

SGN INT ABS SQR RND SIN  
COS TAN ATN LOG EXP  $\pi$

### Logical Operators

AND OR NOT

### Operation Commands

RUN NEW CLR LIST CONT FRE

### Formatting Functions

TAB POS SPC

### Machine Level Statements

PEEK POKE

Allow the user to examine and store at specific memory locations.

USR SYS

Link BASIC to machine language subroutines with parameter passing or developmental subsystems.

WAIT

Monitors status of a memory location such as an I/O port until specified bits are set.

### String Functions

LEFT\$ RIGHT\$ MID\$

Returns substrings (of specified length and position) of string acted upon.

CHR\$ ASC

CHR\$ returns a character, given a numeric code.

ASC returns a numeric code corresponding to a character.

LEN

Returns the length of a string.

VAL STR\$

Convert decimal values to numeric strings and vice-versa.

### Extended I/O Statements

OPEN CLOSE

Control association of a logical file number to a physical device and, optionally, a file name on the device.

SAVE LOAD VERIFY

Store and retrieve a program, with optional file name, on a physical device. Load allows for program overlay, VERIFY compares contents of memory to stored program.

PRINT# INPUT# GET#

Allow communication with logical device numbers other than keyboard or screen. GET# inputs one character.

CMD

Permits communication with multiple devices simultaneously.

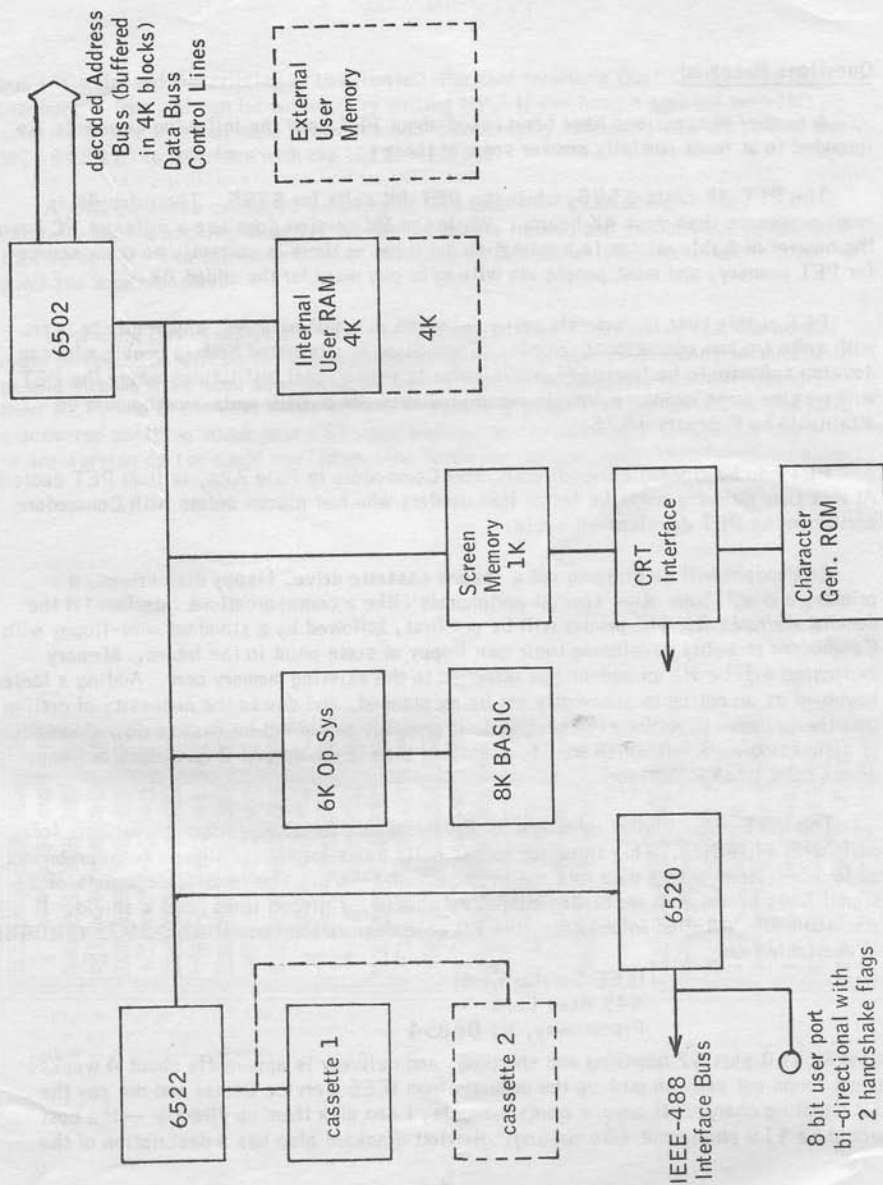
### Example of I/O Operations

#### Tape-to-tape file copy

```
10 OPEN 5,1,0,"OLD FILE"  
20 OPEN 6,2,1,"NEW FILE"  
30 INPUT #5,AS  
40 IF ST AND 64 GO TO 70  
50 PRINT #6,AS  
60 GO TO 30  
70 CLOSE 5  
80 CLOSE 6
```

Program locates "OLD FILE" on tape #1, writes file header for "NEW FILE" on tape #2, then copies tape #1 to #2 until it encounters an EOF on #1, and then writes an EOF on #2.

# PET 2001 BLOCK DIAGRAM



### Questions Received

A number of questions have been asked about PET, and the following comments are intended to at least partially answer some of these:

The PET 4K costs \$595, while the PET 8K sells for \$795. The extra 4K is more expensive than most 4K boards. While the 8K version does use a different PC board, the answer probably relates to a marketing decision -- there is currently no other source for PET memory, and most people are willing to pay more for the added 4K.

PET at this time is currently being delivered in small numbers, apparently to users with software and educational priority. Commodore is interested both in people who can develop software to be licensed, and in sales to educational institutions where the PET will receive large exposure. Anticipated production of 5,000 units/month could be attainable by February 1978.

PET can be ordered either directly from Commodore in Palo Alto, or from PET dealers. At this time delivery might be faster from dealers who had placed orders with Commodore earlier in the PET development cycle.

Commodore will be bringing out a second cassette drive, floppy disk drives, a printer, and will have other special peripherals (like a communications interface) if the demand warrants it. The printer will be out first, followed by a standard mini-floppy with Commodore probably developing their own floppy at some point in the future. Memory expansion will be via an add-on box attached to the existing memory port. Adding a larger keyboard as an option is apparently not being planned, and due to the necessity of getting into the firmware to replace the keyboard, it probably would not be easy to do. Commodore is discussing a PET II which would have a full size keyboard and 2 cassettes or floppy drives built into the cabinet.

The IEEE-488 Digital Interface for Programmable Instrumentation is available for peripheral expansion. This interface is basically a bus for digital signals to interconnect up to 15 devices with a data rate not in excess of 1Mb/s. The interface consists of 16 signal lines of which 8 are bi-directional data paths, 7 ground lines, and a shield. If you would like detailed information, the 80 page description manual 488-1975 (SH04887) is available from:

IEEE Service Center  
445 Hoes Lane  
Piscataway, NJ 08854

Cost is \$10 plus \$2 handling and shipping, and delivery is apparently about 4 weeks. I just found out you can pick up the manuals from IEEE Service Center and not pay the \$2 handling charge. If anyone wants manuals, I can pick them up directly -- the cost would be \$10 plus about 60¢ mailing. Hewlett-Packard also has a description of the



bus ("Condensed Description of the Hewlett-Packard Interface Bus"). I believe the brochure is free and can be obtained by writing HP. If you have a problem with this, send me a note -- I can make a few copies. Incidentally, Motorola has announced the MC68488 IC to interface with the IEEE-488 bus.

A joint purchase cannot be arranged at this time from Commodore -- they will certainly have a backlog of orders for the immediate future, and do not have to discount PET to sell it. For the same reason, probably no dealers will be interested in group purchase arrangements.

In closing this issue of the PET User Notes, I want to emphasize that the normal mode of operation will be to publish information received from PET users. A number of people already have been sending notes and letters on software and hardware plans for their PET, and in the next issue we will begin using some of the material. If you have discovered anything about your PET, are working on (or interested in) special applications, or are working on (or could use) expansion hardware, please send the information along.



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First Class

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